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The effects of gliadin on urine metabolome in mice

Henrik Munch Roager[1], Li Zhang[1], Henrik Lauritz Frandsen[2], Tine Rask Licht[1]

[1]Division of Food Microbiology, National Food Institute, Technical University of Denmark, Denmark.
[2]Division of Food Chemistry, National Food Institute, Technical University of Denmark, Denmark.

Gliadin, a proline-rich protein of gluten, is thought to modulate the gut microbiota and affect the intestinal permeability and immune system. However, little is known about the long-term effects of gliadin on the host and microbial metabolism. To study this, we compared the urine metabolome of two groups of mice, which were on a high fat diet with and without gliadin, respectively, for 23 weeks. Using liquid chromatography mass-spectrometry (MS) followed by multivariate analyses we were able to show a clear separation of the two groups of mice based on their urine metabolome. Discriminating urinary metabolites were identified by tandem MS and compared to MS libraries and authentic standards. Gliadin mice had higher levels of proline-containing dipeptides most likely originating from the gliadin itself. Furthermore, higher levels of tryptophan- and tyrosine-related metabolites were observed in the gliadin mice. Also, Maillard reaction products and β-oxidized tocopherols were observed in higher levels in the urine of gliadin mice, suggesting increased oxidative stress in the gliadin mice. Indisputably, gliadin affected the urine metabolome. However, the mechanisms behind the observed metabolite changes are yet to be elucidated.